WHAT IS CLAIMED IS:

1. An exposure method comprising:

preparing a first mask in which a size of a mask pattern is measured in advance;

calculating a first exposure quantity to be applied to the first mask to provide a first resist pattern by using the first mask;

simulating optical intensity distributions on a wafer in a case where the first mask is used and an optical intensity distribution on the wafer in a case where a second mask is used, a size of a mask pattern of the second mask being measured in advance;

calculating a difference in optical intensity between the first mask and the second mask from the simulated optical intensity distributions; and

calculating a second exposure quantity to be applied to the second mask to provide a second resist pattern, from the first exposure quantity and the difference in optical intensity.

2. The exposure method according to claim 1, wherein the mask pattern of each of the first mask and the second mask is a line-and-space pattern.

3. An exposure method comprising:

preparing a first mask in which a size of a mask pattern is measured in advance;

calculating a first exposure quantity to be applied to the first mask to provide a first resist

pattern by using the first mask;

calculating an exposure quantity difference from a mask pattern size difference of mask patterns between the first mask and a second mask by an optical simulation, a size of a mask pattern of the second mask being measured in advance;

calculating a ratio of the exposure quantity difference in the second mask with respect to the first exposure quantity to be applied to the first mask, from the exposure quantity difference; and

calculating a second exposure quantity to be applied to the second mask to provide a second resist pattern, from the first exposure quantity and the ratio of the exposure quantity difference.

4. The exposure method according to claim 3, wherein the mask pattern of each of the first mask and the second mask is a line-and-space pattern.

5. An exposure method comprising:

preparing a first mask in which a size of a mask pattern is measured in advance;

calculating a first exposure quantity to be applied to the first mask to provide a first resist pattern by using the first mask and a first exposure device;

simulating an optical intensity distribution on a wafer in a case where the first mask is used and an optical intensity distribution on the wafer in

a case where a second mask is used, a size of a mask pattern of the second mask being measured in advance;

calculating a difference in optical intensity between the first mask and the second mask from the simulated optical intensity distributions;

calculating a second exposure quantity to be applied to the second mask to provide a second resist pattern in a case where the first exposure device is used, from the first exposure quantity and the difference in optical intensity;

determining a third exposure quantity to be applied to the first mask to provide the first resist pattern in a case where the second exposure device is used, from exposure data accumulated, and calculating a difference between the third exposure quantity and the first exposure quantity; and

calculating a fourth exposure quantity to be applied to the second mask to provide the second resist pattern in a case where the second exposure device is used, from the difference in exposure quantity and the difference in optical intensity.

6. The exposure method according to claim 5, wherein the mask pattern of each of the first mask and the second mask is a line-and-space pattern.

7. The exposure method according to claim 5, wherein each of the first exposure device and the second exposure device is an excimer laser exposure

device.

8. An exposure quantity calculating system comprising:

an exposure device;

exposure calculating unit connected to the exposure device, an input unit configured to input data, a mask pattern size measuring unit configured to measure a size of a mask pattern of a mask, a resist pattern size measuring unit configured to measure a size of a pattern formed on a resist film, and a storage configured to store data; and

an optical intensity distribution simulating unit connected to the exposure condition calculating unit and incorporating an optical simulation tool,

wherein a difference in optical intensity between a first mask to be first used and a second mask to be later used is calculated by the optical intensity distribution simulating unit, and an optimum exposure quantity to be applied to the second mask is calculated by the exposure condition calculating unit.

9. The exposure quantity calculating system 8, according to claim wherein the exposure device is an excimer laser exposure device.

10. The exposure quantity calculating system 8, according to claim wherein the mask pattern of the mask is a line-and-space pattern.

11. An exposure quantity calculating system

comprising:

an exposure device;

exposure condition calculating unit connected to the exposure device, an input unit configured to input data, a mask pattern size measuring unit configured to measure a size of a mask pattern of a mask, a resist pattern size measuring unit configured to measure a size of a pattern formed on a resist film, and a storage configured to store data; and

an optical intensity distribution simulating unit connected to the exposure condition calculating unit and incorporating an optical simulation tool,

wherein a ratio of exposure quantity difference based on a mask pattern size difference of mask patterns between a first mask to be first used and a second mask to be later used is calculated by the optical intensity distribution simulating unit, and an optimum exposure quantity to be applied to the second mask is calculated by the exposure condition calculating unit.

12. The exposure quantity calculating system 11, according to claim wherein the exposure device is an excimer laser exposure device.

13. The exposure quantity calculating system 11, according to claim wherein the mask pattern of the mask is a line-and-space pattern.

14. A method of manufacturing a semiconductor

device comprising:

preparing a first mask in which a size of a mask pattern is measured in advance;

calculating a first exposure quantity to be applied to the first mask to provide a first resist pattern by using the first mask;

simulating optical intensity distributions on a wafer in a case where the first mask is used and an optical intensity distribution on the semiconductor wafer in a case where a second mask is used, a size of a mask pattern of the second mask being measured in advance;

calculating a difference in optical intensity between the first mask and the second mask from the simulated optical intensity distributions;

calculating a second exposure quantity to be applied to the second mask to provide a second resist pattern, from the first exposure quantity and the difference in optical intensity;

exposing a semiconductor wafer to light with the calculated second exposure quantity via the second mask to form the second resist pattern in a resist film formed on the semiconductor wafer and etching unnecessary portions of the resist film; and

forming a patterned layer on the semiconductor wafer by using the second resist pattern as a mask.

15. The method of manufacturing a semiconductor

device according to claim 14, wherein the mask pattern of each of the first mask and the second mask is a line-and-space pattern.

16. A method of manufacturing a semiconductor device comprising:

preparing a first mask in which a size of a mask pattern is measured in advance;

calculating a first exposure quantity to be applied to the first mask to provide a first resist pattern by using the first mask;

exposing a semiconductor wafer to light with the calculated first exposure quantity via the first mask to form the first resist pattern in a resist film formed on the semiconductor wafer and etching unnecessary portions of the resist film;

forming a patterned layer on the semiconductor wafer by using the first resist pattern as a mask;

calculating an exposure quantity difference from a mask pattern size difference of mask patterns between the first mask and a second mask by an optical simulation, a size of a mask pattern of the second mask being measured in advance;

calculating a ratio of the exposure quantity difference in the second mask with respect to the first exposure quantity to be applied to the first mask, from the exposure quantity difference; and

calculating a second exposure quantity to be

applied to the second mask to provide a second resist pattern, from the first exposure quantity and the ratio of the exposure quantity difference; and

exposing the semiconductor wafer to light with the calculated second exposure quantity via the second mask to form the second resist pattern in a resist film formed on the semiconductor wafer and etching unnecessary portions of the resist film; and

forming a patterned layer on the semiconductor wafer by using the second resist pattern as a mask.

17. The method of manufacturing a semiconductor device according to claim 16, wherein the mask pattern of each of the first mask and the second mask is a line-and-space pattern.

18. A method of manufacturing a semiconductor device comprising:

preparing a first mask in which a size of a mask pattern is measured in advance;

calculating a first exposure quantity to be applied to the first mask to provide a first resist pattern by using the first mask and a first exposure device;

simulating an optical intensity distribution on a wafer in a case where the first mask is used and an optical intensity distribution on the wafer in a case where a second mask is used, a size of a mask pattern of the second mask being measured in advance;

calculating a difference in optical intensity between the first mask and the second mask from the simulated optical intensity distributions;

calculating a second exposure quantity to be applied to the second mask to provide a second resist pattern in a case where the first exposure device is used, from the first exposure quantity and the difference in optical intensity;

determining a third exposure quantity to be applied to the first mask to provide the first resist pattern in a case where the second exposure device is used, from exposure data accumulated, and calculating a difference between the third exposure quantity and the first exposure quantity;

calculating a fourth exposure quantity to be applied to the second mask to provide the second resist pattern in a case where the second exposure device is used, from the difference in exposure quantity and the difference in optical intensity;

exposing a semiconductor wafer to light with the calculated fourth exposure quantity by using the second exposure device via the second mask to form the second resist pattern in a resist film formed on the semiconductor wafer and etching unnecessary portions of the resist film; and

forming a patterned layer on the semiconductor wafer by using the second resist pattern as a mask.

19. The method of manufacturing a semiconductor device according to claim 18, wherein the mask pattern of each of the first mask and the second mask is a line-and-space pattern.

20. The method of manufacturing a semiconductor device according to claim 18, wherein each of the first exposure device and the second exposure device is an excimer laser exposure device.